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Marvin Frankel
Department of Economics

Charles M. Linke
Department of Finance

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Marvin Frankel
Department of Economics
University of Illinois at Urbana-Champaign

Charles M. Linke
Department of Finance
University of Illinois at Urbana-Champaign

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ABSTRACT

In recent years, the value-of-life literature, accompanied by expert testimony from economists, has found its way into the courts under the rubric of hedonic damages. Yet important issues concerning the relevance of this literature and the reliability of its estimates remain unsettled. One such issue involves the value-of-life concept, and in particular the relation between compensation for small risks and the value of a whole life. Can the estimated worth of incremental changes in risk be scaled up to allow literally for the valuation of an identifiable life? A second issue concerns the wide divergence in value-of-life estimates that are found in the literature. Is this divergence explainable in a systematic way, or does it result from the fragility of data and estimating methods? It seems unlikely that claims for hedonic damages in the courts can make great headway unless economists reach a supportive consensus on these questions. The findings of this paper are not reassuring in this regard. They suggest that the underlying difficulties are fundamental and not in early prospect of resolution.

THE VALUE OF LIFE AND HEDONIC DAMAGES:
SOME UNRESOLVED ISSUES

by

Marvin Frankel and Charles M. Linke*

I. Introduction

The value-of-life literature has grown substantially over the past 15 years. Contributions include both estimates of the value of life and critical discussions of their meaning and limitations. More recently, with use of the value-of-life concept and related data in the courtroom, a heightened interest in the subject and in the reliability of the supporting research has developed. But at this point in time, there would appear to exist more discord than agreement on major themes in the literature.

This paper identifies and reviews three important issues on which significant discord persists. The first such issue concerns the value-of-life concept and, in particular, the relation between compensation for small risks and the value of a whole life. Should such compensation be viewed essentially as a measure of the worth, say, of incremental improvements in safety, and thus as a figure suitable for use in cost-benefit analysis? Or can the figure be scaled up to allow literally for the valuation of a whole life?

The second issue concerns the wide divergence in value-of-life estimates that are found in the literature. Are the differences that we observe merely a valid reflection of the demographic, occupational, and

*The authors are respectively Professor of Economics and Professor of Finance and Head of the Department, University of Illinois at Urbana-Champaign.

behavioral differences among the subject groups used by researchers? Or are they, in major part, a consequence of various estimating limitations--deficient perceptions and behavioral anomalies among the members of those groups, imperfect data bases, and biased sets of regression results? Does the literature yet provide us with credible and persuasive sets of estimates? If so, what are the distinguishing features of these estimates, and do they fall within a delimited range?

The third issue involves the use, limited to date, of the value-of-life concept and value-of-life estimates in wrongful death and personal injury litigation, under the rubric of hedonic damages. The claim for such damages typically is entered as a complement to the more traditional claim based on lost earnings. Can the courts benefit from economics in this area? Is the value-of-life concept appropriate to a litigation context, and are the associated estimates suited to its needs?

It seems unlikely that claims for hedonic damages, supported by the value-of-life literature and the testimony of economists, can make great headway in the courts unless economists reach an affirmative consensus on the last of these questions. Moreover, it is difficult to see how any such consensus can be achieved without a prior affirmative consensus on each of the other two questions. The credibility and relevance of value-of-life studies rests unavoidably on the sufficiency of their conceptual and empirical underpinnings.

II. The Value of Life Concept: A Risk Increment Versus a Whole Life

There are no market transactions in whole lives and hence no market prices for such lives. There are, however, selected markets or market-like situations in which people receive compensation for accepting a small risk to life, or alternatively pay a sum to reduce a risk to life. The procedure for valuing a whole life thus involves an extension or extrapolation from these small risk situations to a situation in which death is certain--that is, has a probability of 1.0.

The familiar paradigm that underlies this procedure is instructive and merits close examination. Imagine a group of 1000 workers who accept employment in an activity carrying an above-normal risk. The extra risk is one fatality in 1000 per year, and each worker, as a condition of accepting it, receives a wage premium of \$2000 per year. There are two distinct ways of interpreting this situation:

1. The aggregate of compensation received by the 1000 workers is \$2 million. Hence it may be said that collectively they value the loss of one of their numbers at that figure.

2. Each individual worker is effectively giving up 1/1000th of his life for \$2000. Hence he must value his whole life at a thousand times as much, or \$2 million.

The first of these interpretations is simply a summation over all the workers of their individual small risk valuations. The resulting valuation of life is essentially a societal or community valuation, not a valuation expressed by any individual worker. The figure of \$2 million is the kind of figure that might appropriately be used in cost-benefit studies of policy actions that would abate, or augment, small

risks affecting some designated population group. The second interpretation is the one at issue, for it underlies our alleged ability to discern the price, critical to a court or jury in hedonic damage awards, that an individual places on the pleasures and satisfactions of living--that is, on his own life. The interpretation rests on the obvious assumption that (very) small-risk valuations can be linearly extrapolated to the probability limit of 1.0, where the individual's own death is certain. Differently, it involves the assumption that the amount of compensation or payment for an increment of risk is independent of the observed risk level.

The truth of this assumption is far from self-evident. Moreover, there is no evidence to support it. One's intuition suggests that as risk rises from very low levels, one's demand for compensation will, sooner or later, begin to rise disproportionately. At very high levels of risk, it may become indefinitely large, as described in Figure 1.¹ One's willingness to accept small risks in exchange for nominal sums does not establish one's willingness even to play the game when the risks are conspicuously life-threatening. Economists would doubtless agree that, at the extreme, no amount of compensation would suffice to persuade the typical person literally to give up his or her life. In this limiting case, the value of life would be indefinitely large. Such a value lacks economic meaning, suggesting that the customary estimating procedure, carried to its logical limit, does not yield an outcome consistent with the familiar results of the marketplace.

We would take note in this connection of the asymmetry that arises between the demand-for-compensation approach (DFC) and the willingness-

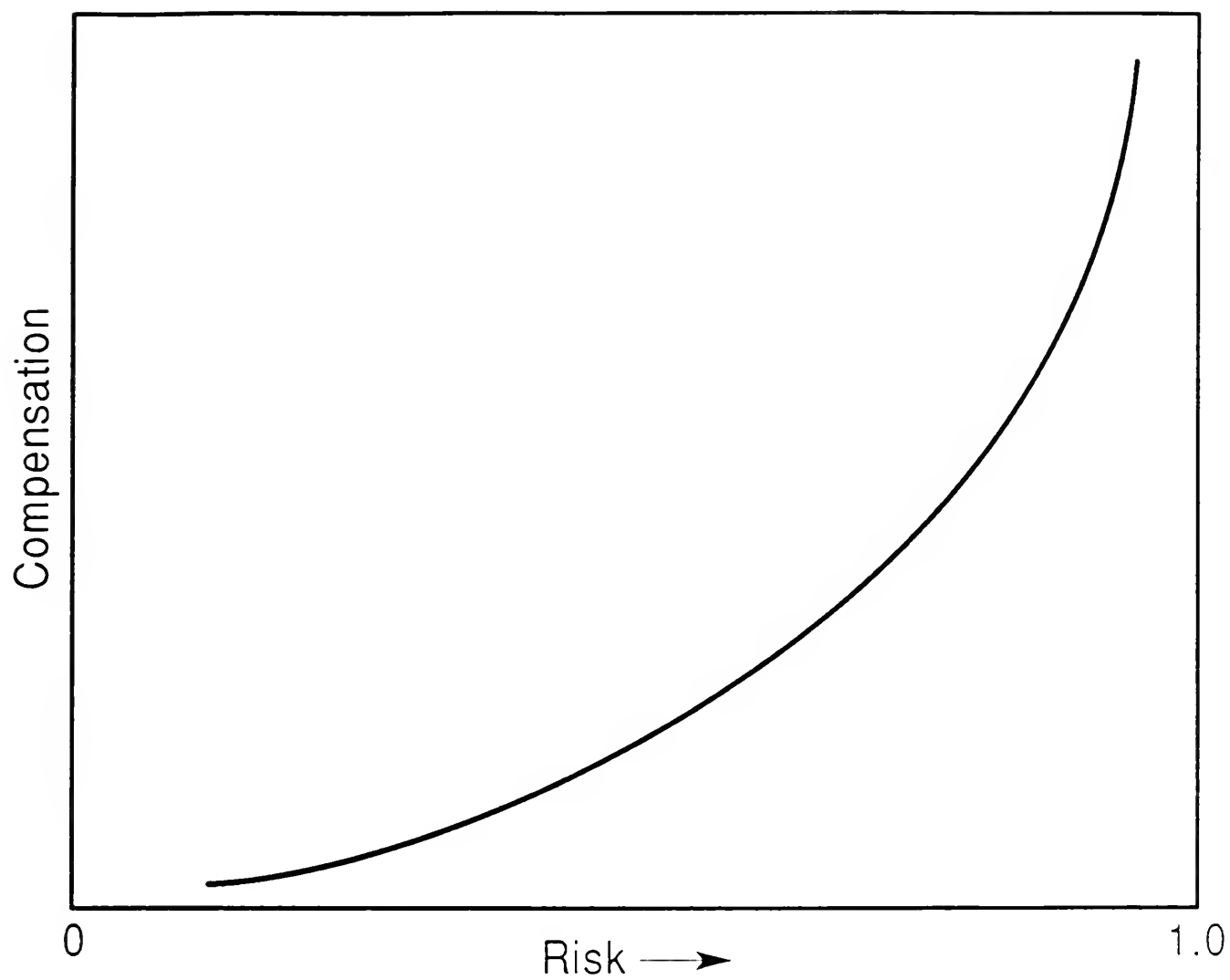


Figure 1. Risk-Compensation Tradeoff

to-pay approach (WTP) in valuing life. At low risk levels the two will be virtually the same. However, WTP is governed by a budget constraint, and that constraint fixes an upper limit on valuation that does not apply, when compensation is considered. The value of life is thus bounded in the one case and unbounded in the other. Notwithstanding this difference, both approaches are subject to the difficulty that valuations in high-risk situations cannot be inferred from people's behavior in low risk--typically very low risk--situations. In the context of this paper, the DFC approach is the more relevant one, since courts treat cases in which injury has already occurred and compensation is the sought-after remedy.

The issue of inferring life's value from data on small risks is certainly not novel. It was considered in the controversial exchange of the late 1970s prompted by John Broome's paper (1978), "Trying to Value a Life." The exchange contained various cross-currents, but its focus was on the usefulness of value-of-life data for cost benefit analysis. Participants in the discussion seemed to agree that the compensation sought by the typical individual, if faced with the immediate prospect of a certain death, would be indefinitely large.² Most of them agreed further that this circumstance notwithstanding, the use of small-risk data in cost-benefit studies was entirely appropriate.³ The participants reached these judgements by routes different from the one taken in this paper. None of them considered the question of hedonic damages and the valuation procedure appropriate to it, and none made explicit the distinction we emphasize between a collective or group valuation of life and a personal or self-valuation of life.

Beyond this early discussion initiated by Broome, there is ample support in the literature for the proposition that small-risk sums cannot be extended to yield the value of a particular life. For example, Schelling (1987, p. 795) observes:

Despite emphasis that our topic is *risk reduction*, there is temptation to talk about the value of a *life saved*. If an individual will pay annually . . . \$100 to reduce some mortal risk to himself from 1:10,000 annually to 1:20,000--a reduction of 1:10,000--it is convenient to say that he "values his own life" at \$2 million. That sounds as if, confronted with certain death, he would come up with \$2 million to stay alive. But that is not what we meant, and it does not follow from the small-risk calculation.

And Blomquist (1979, p. 541) comments in the same vein:

"Value of life," as the term is used in this paper . . . is based on changing the probability of survival by a small amount. For easy comparison among situations where the changes are small but unequal . . . the value of a marginal change is extrapolated to a unit (0-1) change. Clearly, it is inappropriate to apply any such value of life to a situation where an identifiable individual faces certain death.

Other examples could be cited.⁴ The quotations suggest the discomfort that many economists feel over assigning a value to an identifiable life. This discomfort doubtless accounts for the frequent presence in the literature of such cautionary phrases as the "value of a statistical life," the "value of an anonymous life," the "value of risk-reduction," and the "full-life-equivalent" value.

A further brief comment may be in order on the distinction between a collective or social valuation of life and a personal or self-valuation of life. There are basically three vantage points from which to value life. First, there is one's valuation of one's own life--a

first party valuation. Second, there is a collective or group valuation of an unidentified or anonymous life, obtained as in risk studies by adding up the fractional valuations of the members of the group. Finally, there is what might be called a third party valuation of life, such as the value attributed to one's life by a spouse, neighbor, or stranger. Each of these valuations has a corresponding decision set. We would urge that a decision in a personal injury or wrongful death case calls for a first-party valuation, since the pleasure and satisfaction lost is that of the victim. In contrast, a group or collective valuation is appropriate in public policy or cost-benefit types of decisions, since the impact of those decisions is on the affected group. Where the intent is, say, to compensate a surviving spouse for her hedonic loss arising from her husband's death, a third party valuation would be in order. We know of no studies giving estimates of this type of valuation.⁵ But there is no reason to suppose that such third party estimates would be systematically related to those based on the other two types of valuation.

The essence of our position is that the three distinct vantage points from which to value life must be attended to and their individual decision domains respected. If one agrees with this, then the now substantial value-of-life literature becomes irrelevant as a source for estimating hedonic damages in personal injury and wrongful death cases.

There is an uneasy way around this difficulty. One might give up the pretense of knowing how individuals value their own lives. Instead one might simply acknowledge that first party valuations are unavailable and propose the use of collective or social valuations in their place.

The value-of-life literature and its estimates would then become eligible for consideration (provided the class of problems discussed below could be overcome). In support of this procedure, it might be argued that collective valuations have a validity of their own, incorporate the decisions of individuals in life-related situations, tell us something relevant and important about how society values life, and are the only alternatives available. It might further be argued that knowledge of such valuations can only improve upon a situation in which juries render judgements unaided by any analytical method or perceptible rationale.⁶ How courts might react to this argument is by no means clear.

III. The Limitations of Value-of-Life Estimates

To date, there have been perhaps 50 or more studies that yield value-of-life estimates. The studies are of three types. The great majority of them fall into the wage-risk category, deriving their estimates by reference to the incremental compensation workers receive for accepting risky employment. A handful of studies focus on people's behavior in consumption situations that involve risk, with estimates derived from data on consumers' willingness to pay for small reductions in risk. The purchase of smoke alarms and the use of seat belts are among the subjects of such studies. A third group of studies, thus far few in number, are based on what often is called the contingent valuation method. Such studies make use of survey techniques, in effect asking respondents what compensation they would require to accept a specified hazard or what sum they would pay to reduce it.

Results from a substantial number of these studies are summarized in Table 1. The wage-risk studies are organized into three classes, based in part on the source of the risk data used in the respective studies and in part on the year the study was undertaken. At the working level, in terms of research techniques and data sources, the studies are highly diverse. With some exceptions, there exist significant differences among them with respect to each of the following:

The particular methodology employed.

The explanatory variables included.

The specification of the regression relationship.

The data sources relied upon.

The source and type of the risk variable used.

These differences make it difficult to compare any pair of studies and to assess their relative merits and the strength of their respective results.

A conspicuous characteristic of the table is the wide range of estimates it displays for the value of life. Many of the individual studies offer a range of estimates, and there are substantial differences both across individual studies and between classes of studies. At the individual level, for example, Dillingham (item 10), offers estimates ranging from \$2.1 to \$5.8 million, and Moore and Viscusi (item 15) give estimates of between \$1.9 and \$6.6 million. The estimates of the consumer market (behavior) studies are rather closely grouped and fall at the lower end of the range. In contrast, the estimates of the wage-risk studies are highly dispersed and include both

Table 1

Value-of-Life Estimates
from a Sample of Studies

Study	(millions of 1986 dollars)	
	Range of estimates	Midpoint value
<u>Early low-range wage-risk estimates</u>		
1. Thaler and Rosen (1975)	0.44-0.84	0.64
2. Arnould and Nichols (1983)	0.72	0.72
3. Dillingham (1979)	0.38-1.2	0.79
<u>Early high-range wage-risk estimates</u> (all based on BLS industry accident rates)		
4. R. Smith (1974)	8.5-14.9	11.70
5. R. Smith (1976)	3.6-3.9	3.75
6. Viscusi (1978)	4.1-5.2	4.65
7. Olson (1981)	8.0	8.00
8. Viscusi (1981)		
a. w/o risk interaction terms	5.4-7.0	6.20
b. with risk interaction terms	4.7-13.4	
9. V. K. Smith (1976)	1.9-5.8	3.85
<u>New wage-risk studies</u>		
10. Dillingham (1985)	2.1-5.8	3.95
11. Marin & Psacharopoulos (1982)		
a. manual workers	2.7-3.1	2.90
b. nonmanual workers	9.0	9.00
12. Low and McPheters (1983)	0.9	0.90
13. Leigh and Folsom (1984)	4.3-10.2	7.25
14. Gegax et al. (1985)		
a. all union workers	1.9	1.90
b. union blue-collar workers	1.6	1.60
15. Moore and Viscusi (1988)	5.2-6.6	5.90
	1.9-2.1	2.00
<u>New contingent valuation studies</u>		
16. Jones-Lee et al. (1985)	1.6-4.4	3.00
17. Gegax et al. (1985)	2.4-3.3	2.85
<u>Consumer market studies</u>		
18. Ghosh, Lees, and Seal (1975)	0.56	0.56
19. Blomquist (1979)	0.38-1.4	0.89
20. Dardis (1980)	0.36-0.56	0.46
21. Ippolito and Ippolito (1984)	0.24-1.26	0.75

Source: The table is adapted from Table 1 in Ann Fisher, L. G. Chestnut, and D. M. Violette, "The Value of Reducing Risks of Death: A Note on New Evidence," Journal of Policy Analysis and Management, Vol. 8, No. 1 (1989), p. 90.

very low and very high values. The wide variability in outcomes is attributable to the several factors cited above.⁷ The mean of the 24 midpoint values is \$3.5 million and the median is \$2.9 million (in 1986 dollars).

The wide divergence in estimates is disturbing, not simply or solely because it exists, but because it has not been explained.

Consider a few possible explanations, not all mutually exclusive:

1. Each estimate represents an attempt to approximate some single "true" value of life. The estimates vary for reasons indicated above-- differences in method, in data used, in specification of the regression form, etc.

2. The true value of life in the population at large varies over a range, perhaps taking the form of a normal distribution. The individual estimates are based on samples from this population, and differences among those estimates merely reflect ordinary sampling variation, along with variation in method, data and the like.

3. The samples underlying the respective estimates represent the distinct subgroups of the general population, each with its preference set, income and other distinguishing characteristics. Differences among the estimates are thus to be expected.

4. Many of the estimates suffer shortcomings sufficiently serious to disqualify them. With their elimination, there remains a core of sound estimates that fall within a restricted, plausible range. The problem of uncomfortable diversity is thus eliminated.

The first explanation can be set aside. Observers might generally agree that estimates, for reasons already indicated, can be expected to

vary. But few, if any, would agree that there exists some single, true value of life. Differences in tastes and in budgets ensure that valuations of consumer goods differ among individuals, and there is no reason to expect otherwise for a consumable like the pleasures and satisfactions of living.

The third explanation also can be set aside. The many studies do indeed rely on varied data sets, but it is not at all clear that these data sets cover distinctive demographic groups whose differences might explain differences in the respective estimates. On the contrary, the groups covered in many of the studies appear to come from the same or similar strata of population. It is no accident that to date no one has attempted to account for the diversity of estimates with this kind of explanation.

In contrast, the fourth explanation has received explicit, if limited, endorsement. T. R. Miller (1990) of the Urban Institute has examined all or most of the studies, along with their estimates, eliminated many of them for alleged analytical or empirical deficiencies, adjusted the results of some of the remaining studies in an effort to achieve consistency and compatibility, and emerged with a restricted set of estimates that fall within a delimited range of approximately \$0.99 million to \$3.60 million, with a median value of \$2.2 million. The procedure has appeal because it significantly reduces the vexing variation in estimates--variation that begs for explanation. However we find the procedure unconvincing. First, some of the adjustments made by the author, which in certain instances cause large changes in the original estimates, are shakily based. Though intended

to resolve particular problems, they succeed at the same time in raising new ones.⁸ Second, to exclude some studies is to give explicit sanction to the remaining ones. Yet virtually all of the studies are subject to major and minor limitations, and one could, if disposed to do so, find grounds for questioning and qualifying the results of any of them. Third, were the procedure to be duplicated by multiple independent observers, we suspect that there would be substantial inconsistencies among the several lists of acceptable and unacceptable studies and of the adjusted estimates.

The second explanation cited above probably carries the greatest appeal for economists. It recognizes variation in the value of life among individual consistent with differences in tastes, income and risk attitudes, and it allows for both variation arising from sample selection and that attributable to methodological and statistical limitations. All this seems reasonable. Unfortunately, at this stage of things, the explanation standing alone is insufficient and merely a point of departure for further inquiry. It does not really help us to understand the sources of errors in the estimates, the importance of those errors for variation in the estimates, and what confidence we should attach to them. Hence our discomfort over the observed variation remains undiminished.

These four possible explanations aside, the studies and their estimates give rise to other concerns. One such concern turns on people's perception of risk. The methods under discussion all presume that people are sensitive to, understand, and respond rationally to small risks and changes therein. Consider an occupational fatality risk

of one in 10,000 per year. Does the average person distinguish between a risk of that magnitude and one that is half as great, or another that is 50 percent or even 100 percent greater? How do such risk levels compare with the non-occupational risk levels we experience in our daily lives? How many of us are aware of the risk levels, expressed in quantitative terms, of our travel, occupational, recreational, and social activities, and of our dietary indulgences? If people lack this kind of knowledge, there is reason to question whether they can respond in a rational, calculated way to a new low risk event or to a change in the very small risk of a current activity. If they cannot, then procedures that assume otherwise will be unable to produce reliable estimates.

Many researchers have shown an interest in this problem, and a few have sought to verify their subjects' knowledge of the risk involved in the situation being considered. But grounds remain for believing that the imperfect knowledge and understanding of risk may seriously compromise value-of-life estimates.⁹

A second concern relates to behavioral anomalies and inconsistencies. Value-of-life investigators understandably focus on those areas of human activity where statistically tractable data on income and risk are available. But this approach means that many segments of behavior relevant to risk valuation are slighted or ignored, raising the possibility that the picture presented by the value-of-life literature is not only partial, but also unrepresentative and biased.

Notwithstanding an absence or near absence of quantitative measures bearing on the matter, a number of areas of human behavior

suggest quite modest or low values of life. Seatbelt use is a case in point. Automobile accidents are the leading cause of injury in the country and a major cause of death, particularly among young people. The efficacy of safety belts, especially the lap and shoulder harness, in reducing both injury and death, is well-known. Yet the use of this safety device remains low. Estimates vary, but it appears that currently, in the absence of state laws requiring use, not more than 30 percent of drivers and passengers wear them. It follows that most people do not think it worth the time and, for some, slight discomfort, to buckle up. The implication is that these people place low values on their lives.¹⁰

Essentially the same observations could be made about smoking. Approximately 28 percent of the U.S. population continues to smoke, despite the significant and well-known health hazards of that activity. Under the valuation method being considered, we would again be led to conclude that the members of this large group value their lives at a relatively low figure.¹¹

Other factors suggest that a more complex relationship between behavior and risk than the value-of-life methodology assumes are worth nothing. Many people undertake hazardous hobbies such as rock climbing, parachuting, or hang gliding. Others ride motorcycles for recreation and transportation, some without helmets. Many pursue or accept lifestyles that carry significant risk. They weigh more than they should. They subject themselves to stressful routines. They follow unhealthy diets. On another level, people hold inconsistent attitudes toward public hazards. They are casual about significant highway hazards, but

alarmist about small risks that may be associated with radiation or pesticide residues. Though these phenomena are not a part of the value of life literature, they are an integral part of the total picture that bears on life's valuation. A viable methodology for estimating the value of life, if there is one, needs to recognize and account for all or most of the relevant facts, not just a convenient subset of them.

A further concern involves the data limitations that investigators commonly face. Value-of-life studies generally must deal with data sets that are not well suited to the purpose at hand. As a result, the research often is led to adjust the data in various ways. For example, wage and risk data typically come from different sources and may not cover identical occupational groups. Or the groups from each of the sources may be somewhat differently defined. Or the wage data may reflect a concept different from the one desired. Or one or both data sets may contain seemingly aberrant observations that could bias the results. Similar problems may exist for other variables--age, education, race, sex--whose influence one wants to control for, or hold constant. In all such cases, the researcher may make adjustments to the data, with the intent of improving its suitability for the purpose at hand. The drawback of such adjustments is that some of them may be of problematic merit. Other researchers in the same situation might choose to make different adjustments or none at all. No less important, one adjustment, or series of adjustments, may be chosen over another not because it is judged to be sounder or more reasonable, but because it yields results that better meet a priori expectations. the upshot is that for many studies, the data will have undergone a degree of

conditioning and manipulation, thereby raising questions about the reliability of the results.

A related difficulty involves a failure in many of the studies to control for one or more important factors, most notably job injury (as distinct from fatality) and the quality of work. Jobs that are risky and that may command a wage premium on that account not only may have high fatality rates but also high injury rates. Such jobs also often possess other unattractive characteristics. They may be dirty, seasonal or irregular, involve outdoor, cold-weather work, and otherwise be short of amenities that most workers desire or expect. If the wage premium for fatality risk is to be accurately isolated, the injury and job quality factors (as well as other factors) must be properly controlled for, since they also are factors that command a payment in excess of the customary or average wage. Otherwise some or all of the premium attributable to these factors will be wrongly assigned to the fatality risk variable, and the value of life will tend to be overestimated. Unfortunately, many value-of-life studies fail to control for job injury, and it is questionable whether occasional indirect attempts to control for job quality have been effective.

Finally, it deserves note that the published results of value-of-life studies represent, albeit in uncertain degree, a restricted or partial sample, though in a way different from that discussed previously. It is a characteristic of most regression studies that reporting on them is incomplete. It is commonly the case when such studies are undertaken that multiple sets of explanatory variables and multiple functional specifications are attempted. Data imperfect to the

purpose may be adjusted, as noted above, and some observations may be excluded as outliers. In the end, several sets of results will be obtained, but only one or a few of them disclosed. Authors may, after the fact, discover plausible rationales for their choices. But the reader is denied the opportunity to assess all the facts and judge for himself the merits of the alternatives. If the regression outcomes of many studies were fully known, it is probable that value-of-life estimates would be dispersed over a wider range than we now observe and would include uncomfortable instances of zero and even negative values of life. Accordingly, we suggest that the published value-of-life studies belong to a restricted set. A fuller picture of those studies, could it be realized, would reduce the confidence that economists, lawyers and courts are willing to place in them.

IV. The Value of Life and the Courts

Personal injury and wrongful death claims based on loss of the pleasures of life are not new to the courts. Perhaps surprisingly, they date back to the middle of the last century.¹² But especially over the past 20 years, this type of claim has become increasingly frequent and is recognized in numerous jurisdictions. Currently, it appears that hedonic damage claims receive a degree of acceptance in most of the 50 states, though not always as an element separate from pain and suffering, while at the federal level, several courts have allowed for hedonic loss in Section 1983 cases involving civil rights violations (see Brookshire and Smith, 1990, p. 239). The figures are imprecise and subject to change as the various courts make new determinations.

What is relatively new, however, is the acceptance by some courts of expert testimony intended to support the concept of hedonic loss and provide a rationale for determining its amount. The noteworthy case in this regard is *Sherrod v. Berry*, heard in a federal district court in Illinois in 1985. Here for the first time supporting testimony by an economic expert was admitted, and acknowledged by the judge as being of substantial assistance to the jury. This recognition opened up the prospect of a growing role for economists in hedonic damage cases. Subsequently, not all courts confronting the issue have agreed with the Illinois court, and it remains to be seen whether the role of the economic expert in hedonic valuation will continue to expand. While we cannot predict the behavior of the courts, we can as economists argue the merits and limitations of hedonic damages and make our recommendations. Can the courts benefit from economics in this area? Is the value-of-life concept appropriate to a litigation context, and are the associated estimates suited to its needs?

Most economists would probably agree that the hedonic concept properly defines the nature of the loss that death brings--the loss of the pleasures and satisfactions of living. Economists would probably also agree, as Mishan (1976, pp. 300-301) long ago pointed out, that foregone earnings misses the mark. While such earnings provide the wherewithal for one's own consumption and for the support of others, thus bringing one satisfaction on both counts, they by no means capture the full range of satisfactions that life allows. Essentially what foregone earnings measure is the individual's contribution to the national product. Such a measure is useful if, say, our concern is for

policies to maximize that product, but it falls short as means of gauging the totality of life's pleasures.

Unfortunately, in a wrongful death case, a proper definition of the nature of the loss, which the hedonic concept provides, does not alone suffice to meet the needs of the courts. To meet that need, at least two requirements must be met. First the hedonic concept must by some legitimate means be translatable into an estimate of the value of life. Second, the estimates must reflect with "reasonable" accuracy the object they are intended to measure. Absent the fulfillment of these requirements, it is difficult to see how the value-of-life methodology can bring any benefit to personal injury or wrongful death litigation.

Consider first the second of the two requirements. In the previous section, the wide range of value-of-life estimates was discussed and the tentative conclusion drawn that the diversity of values was best explained by a combination of sampling variation and the limitations and weaknesses of the underlying estimating procedures. How might these data be utilized in expert testimony on the value of a particular life? All that can reasonably be done is to refer to the middle of the range of estimates, choosing the mean or median value, with appropriate allowance for error. Thus, if Table 1 contained our universe of estimates, we might choose the median value of \$2.9 million as representative, noting also some measure of dispersion around this figure. Were we to justify restricting the eligible values to the 15 wage studies, the median would be \$3.8 million. there is no body of information that would assist us in tailoring an estimate of this kind to the characteristics of an individual situation--to whether the

subject is male or female, a blue or white collar worker, married with children or single, or a person of optimistic or gloomy disposition.

The reader may judge for himself whether such a procedure meets the test of reasonable accuracy. Bear in mind that the procedure overlooks most of the limitations previously cited, in particular the weaknesses of individual regression studies, the incompleteness of the regression record, and the seemingly aberrant behavior of individuals in a variety of risk situation. Contrast this procedure with that used to estimate the present value of foregone earnings. In the latter case, the subject will usually have a work history that offers a decently firm starting point for calculations. In this case also, adjustments can be made as needed for the subject's age, sex, education, occupation and possibly other factors so as to secure a result that is subject-specific rather than generic. In a given case, estimates by different analysts may vary, but accuracy is not a major issue.

Of course foregone earnings do not measure the lost pleasure of living. Yet it may fairly be said that they do capture a significant part of it. For earnings and outlays therefrom provide the basis for pleasure-generating consumption expenditures. They thus might be taken as a lower bound for the value of the subject's life.

The opinions rendered by courts on the accuracy question with respect to hedonic damages are thus far mixed. In the Sherrod case (1985, p. 164), the trial court commented as follows:

The fact that the hedonic value of human is difficult to measure did not make either Smith's testimony or the damages speculative... The rule against recovery of "speculative damages" is generally directed against uncertainty as to cause rather than uncertainty as to measure or

extent. That is, if it is uncertain whether the defendant caused the damages, ... there may be no recovery of such uncertain damages; whereas uncertainty which affects merely the measure or extent of the injury suffered does not bar a recovery.

The court did not suggest within what bounds, if any, uncertainty must fall to make estimates admissible. But since the expert testimony was allowed, the bounds were presumably not exceeded. By contrast, in a quite recent personal injury case heard in federal court in Chicago, similar expert testimony was disallowed, with the judge observing,¹³

Courts will always lag behind scientists as far as science is concerned. The risk to justice from pseudo-science is substantial, and we avoid this risk by requiring some showing of reliability and validity, either by direct proof or by proof of acceptance by the appropriate scientific community.

Clearly the judge did not believe that economists had achieved an affirmative consensus on the studies and their estimates.¹⁴

The issue of accuracy aside, there remains the requirement that the hedonic concept be translatable into a valid, if somewhat imprecise, measure of life's value. For if such a translation is not achievable, then the value-of-life literature becomes irrelevant as a means of gauging the loss of the pleasures of living. Section II above dealt with this issue, concluding that findings based on behavior in small risk situations could not validly be used to infer a person's valuation of his whole life. If one accepts this conclusion, and it seems to be a view that many economists share, then one is obliged to restrict uses of the value-of-life literature to cost-benefit applications in which decisions involve actions to abate small risks. There remains, of

course, the question of whether the value-of-life estimates offer sufficient accuracy in this restricted domain.

V. Concluding Note

Courts are not handmaidens to economists. They need not be persuaded by economic arguments or move in ways consistent with the tide of economic thinking. At the same time, they are sometimes receptive to such thinking and its supporting data. A consensus among economists on their ability to value life and the soundness of the relevant literature would likely accelerate the acceptance of hedonic damage claims by the courts and of economists as expert witnesses. A clear consensus to the contrary would surely move the courts in the opposite direction. The tenor of recent and current debate on hedonic damages and value-of-life estimates suggests to us that no consensus has yet emerged. Moreover, with the estimates vulnerable to challenge on multiple grounds, as described in previous paragraphs, we doubt that a meaningful consensus will be forthcoming anytime soon. In these unsettled circumstances, for the near term, the odds appear to favor, at most, a modestly growing role for hedonic damage claims and supporting economic testimony, if only because that role currently is limited and there remain so many eligible jurisdictions.

Footnotes

¹The curve is a simple transform of an indifference curve relating income to safety. Its slope, which value-of-life studies seek to estimate, expresses the marginal rate of substitution between income and risk.

²Broome's rationale for regarding the value of life as indefinitely large is not entirely clear. At one point taking an ex post view, he comments, "For no finite amount of money could compensate a person for the loss of his life, simply because money is no good to him when he is dead." But an ex ante view is reflected in certain of his illustrations which indicate that no amount of compensation would suffice to persuade a person to accept the prospect of certain and immediate death. See pp. 92-3. Our vantage point is the ex ante one.

³Broome clearly did not agree with this position, but others did. See, for example, Jones-Lee (1979); Buchanan and Faith (1979); and Mishan (1981, pp. 300-301).

⁴E.g., Linnerooth (1979, p. 55); Dardis (1980, p. 1078); Marin and Psacharopoulos (1982, p. 828); Chestnut and Violette (1990, pp. 79, 82); and Viscusi (1990, p. 10).

⁵One might expect that generally, with conspicuous exceptions, third party valuations would be highest among a subject's immediate family members and diminish rapidly as the circle of acquaintances widened.

⁶An interesting valuation approach for use in the courts is suggested by Havrilesky (1990, p. 74):

The fundamentals of economics insist that demand functions are constrained by income. The demands for widgets, gizmos, or the quality of life are income-constrained. Therefore, abstracting from matters of deterrence, rewards for wrongful death and injury should, as a matter of principle, seldom exceed the present discounted value of future income net of the subsistence consumption of the individual . . .

This approach, at least on its boundary, is obviously close to the foregone earnings approach so widely used in the courts. Depending on its manner of implementation, it might well afford some opportunity to draw on the value-of-literature in adjudicating plaintiffs claims.

⁷The sensitivity of value-of-life estimates to one of those factors--the data sources relied upon--is nicely illustrated in the paper by Moore and Viscusi (1988), cited in Table 1. Utilizing job

fatality data from the National Institute of Occupational Safety and Health (NIOSH), they obtain value-of-life estimates approximately double those obtained when Bureau of Labor Statistics risk data are used. They regard the NIOSH data as providing more accurate and reliable basis for estimation.

⁸We think this is the case--to cite but a few instances--with respect to the adjustment of estimates for the differences between actual and perceived risk; the adjustment applied to studies using BLS risk data without industry dummy or worker-specific risk variables; the adjustment of presumed underestimates in studies based on Society of Actuaries data; and an adjustment of Moore and Viscusi estimates to compensate for failure to include industry dummy variables. See Miller (1990), pp. 19, 22 and 23. We sympathize with the effort to screen the large number of value-of-life studies and to adjust the disparate results to a comparable basis, and we have benefitted from Miller's analysis of the limitations affecting those studies. But rather than leaving us with a core of credible studies, we think this effort serves to highlight the weaknesses of the studies and the fragility of the procedures for adjusting the results.

⁹The ability of individuals to evaluate and rationally respond to small risks was given some attention in the study by Jones-Lee, Hammerton and Philips (1985). Their results are not entirely reassuring. See pp. 65-68. See also Lichtenstein et al. (1978). It should be noted, moreover, that in a survey study hypothetical situations can be presented to respondents in ways that facilitate clarity of perception and understanding. For wage-risk and consumer behavior studies, no similar opportunity exists.

¹⁰In a study of seatbelt use, Glenn Blomquist (1979) estimated the value of life for all drivers as between \$380,000 and \$1.4 million, as reported in Table 1, with a best estimate of \$622,000 (in 1986 dollars). Separate estimates for belt users and non-users are not given. The estimates are quite sensitive to the assumptions underlying the analysis.

¹¹Estimates of the value-of-life based on the response of people to the health hazards of smoking are given by Ippolito and Ippolito (1984). The results are reported in Table 1 above and show a range, for smokers and non-smokers combined, of from \$240,000 to \$1.26 million. The authors' "best" estimate is \$401,000 (in 1986 dollars). The estimate for smokers is about two-thirds of this figure.

¹²In an 1857 case, rendering judgment for the plaintiff, the New York State Court of Appeals wrote,

The law guaranties to every person the right of personal security, which includes the uninterrupted enjoyment of his life and limbs, his health and reputation; and he who, by a wilful or by a culpably negligent act, deprives him of these blessings, or interferes with the full enjoyment of them,

subjects himself, in addition to such public punishment as the law has provided, to the liability of making compensation in damages to the aggrieved party.

See *Ransom v New York & Erie R.R. Co.*, 15 New York 415, p. 416.

¹³*Mercado v Ahmed and Checker Taxi Co.*, Memorandum Opinion of Judge J. B. Zagel, U.S. District Court (N.D. Ill., 1991), p. 11.

¹⁴According to Michael Ortyl, a defense attorney in the case, the ruling is one of nine in Illinois to reject testimony on hedonic damages in personal injury cases. Stanley Smith, economist for the plaintiff, observed in response that such testimony has been allowed in federal and state courts in 13 states and disallowed in only three--Minnesota, Wisconsin and Illinois. Even in the latter three, different courts have ruled in opposite ways. Wall Street Journal, March 27, 1991.

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